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TOTAL REACH: BALANCING ACTIVE AND RESERVE AIR MOBILITY FORCES

A RESEARCH PAPER

by

Kenneth Mills
Colonel, USAF

SUBMITTED TO THE FACULTY

IN

FULFILLMENT OF THE CURRICULUM

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MAXWELL AIR FORCE BASE, ALABAMA

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ABSTRACT

TITLE: Total Reach: Balancing Active and Reserve Air Mobility Forces

AUTHOR: Kenneth Mills, Colonel, USAF

By 1995, over half of the nation's capability to deploy combat force by air will reside in the Air National Guard and the Air Force Reserve. The absence of an overriding Soviet threat and mounting budgetary pressures could result in an even further shift of forces toward the reserve components. Although the air reserve components have proven themselves to be a ready, credible force, a dramatic shift in the delicate balance between active and reserve forces raises questions of cost-effectiveness. Such a shift could also have a harmful impact on the ability of the active component to support the reserve components with technical assistance and to sustain the reserve's requirement for experienced, prior service personnel. Due to the historical roots of the reserves in U.S. society and the role they play in the balance of power between the President, the Congress, and the states, any decision to radically alter the share of the Total Force borne by the reserve components will have significant military and political implications.

BIOGRAPHICAL SKETCH

Colonel Kenneth Mills (M.S., Illinois Institute of Technology) has been interested in the balance between active and reserve component air forces since he served as Chief of the Rated Management Branch, Headquarters United States Air Force, Directorate of Operations. Colonel Mills was a KC-135 squadron commander and served as Deputy Commander for Operations of the 1703rd Provisional Air Refueling Wing during Operations Desert Shield and Desert Storm. He is a graduate of the Air War College class of 1993.

INTRODUCTION

In the last days of the Bush Administration the White House published the latest version of the National Security Strategy of the United States. The document outlines challenges the country will face in a rapidly changing international environment and provides defense planners with the broad guidance needed to shape future military forces to best protect national interests and objectives. In shaping such forces, planners must address the ultimate national security question--how much military capability is enough?

This paper examines one aspect of that question--how much of the nation's military capability should reside in the reserve components (National Guard and Reserve)? It focuses on the Air Force, a service recognized for its integration of the Air National Guard and Air Force Reserve under the Total Force Policy.[1] The discussion centers on air mobility forces. In 1992 the Air Force consolidated most of its capability to deploy U.S. military forces by air into one command, the Air Mobility Command. Air Mobility Command's airlift and air refueling aircraft are critical to a nation whose security strategy must deal with regional challenges across the globe.

Debate will continue on the size and structure of forces necessary to implement a regionally focused defense strategy. The collapse of the Soviet Union and the demise of the Warsaw Pact have created conditions that appear to support a reduction in U.S. military forces. In recognition of emerging global realities, the Bush Administration proposed a minimum essential military force, the Base Force. President Clinton will continue the search for a "minimum

essential" force level. Within that smaller force, the balance of active and reserve components may shift. If reserve forces are more economical, then it makes fiscal sense to increase the reserve component share of the Total Force, especially when warning times have increased and forward deployed troops are coming home.

Fiscal pressures, however, must be balanced by mission effectiveness. The Total Force must remain credible--the world is still a dangerous place where the absence of the overriding Soviet threat does not mean that no threats exist. Proliferation of highly capable weapons and weapons of mass destruction is increasing. With the mantle of the Cold War removed, border disputes and ethnic tensions have reemerged. To promote stability, the United States has exerted its leadership by responding militarily in Southwest Asia, Somalia, and Bosnia. Secretary of Defense Les Aspin, when Chairman of the House Armed Services Committee, recommended shaping flexible U.S. military forces to handle a number of small, simultaneous contingencies.[2] The message is clear--the U.S. will engage militarily if necessary to promote global and regional stability.

These engagements will certainly involve both active and reserve forces. The use of reserve forces is deeply ingrained in American society--the militia is mentioned in Articles I and II of the Constitution. The Total Force Policy, implemented by Secretary of Defense James Schlesinger in 1973, fully integrates the active and reserve components. It specifies that both components can be expected to meet initial contingency demands for forces. More recently, Senator Sam Nunn, Chairman of the Senate Armed Services Committee, has advocated increased reliance on the reserve components.[3] The first major test of the Total Force Policy occurred during Desert Shield/Storm. A 1992 congressionally mandated study on the Total Force conducted by the RAND corporation concludes

that the "Total Force Policy, while not without some problems and not without some controversy, was effective in the Persian Gulf Conflict."[4]

It is time to look beyond Desert Storm and consider force reductions beyond the Base Force. This requires tackling tough reserve component issues, including cost, readiness, sustainability, and accessibility (the ability of the National Command Authority to call on reserve forces in a crisis).

BALANCING THE FORCE

Integration of Air Reserve Component Mobility Forces

The Air Force's latest strategic planning framework, Global Reach--Global Power, supports the national military strategy by combining versatile combat forces with rapid global mobility. Air mobility forces provide Global Reach, the capability to deploy forces from all of the military services quickly. Former Secretary of the Air Force Donald B. Rice has stated that providing global mobility takes on increased importance when balancing the need for global reach with reductions in overseas bases.[5] USAF doctrine--how the service believes it can best employ its forces--includes both airlift and air refueling among five crucial force enhancement missions. The doctrine contends that airlift forces are the backbone of nonnuclear deterrence and that air refueling is vital to the global exploitation of air power's flexibility.[6]

Since the implementation of the Total Force Policy, the Air National Guard and Air Force Reserve have played an increasingly important role in the mobility mission. In fact, the best example of Total Force integration may exist in air mobility forces. Table 1 shows the balance of active and reserve component mobility forces as of December 1992. By 1995, over 50 percent of the nation's total airlift and air refueling capability will be contained in the

air reserve components. Alternative force structures, examined later, include even greater reserve participation.

Table 1

Air Reserve Component Share of Mobility Forces[7]

	Aircraft (%)		Aircrew (%)	
	Active	ARC	Active	ARC
C-5	64.2	35.8	38.2	62.8
C-141	89.7	10.3	46.3	53.7
C-130	36.0	64.0	36.2	63.8
KC-10	100.0		57.2	42.8
KC-135	67.0	33.0	63.2	36.8

The air reserve components possess C-5, C-141, C-130, and KC-135 squadrons to support the air mobility mission. In addition to these flying units, Air Force Reserve personnel augment active flying units through the Reserve Associate Program. An associate unit draws manpower from both active and reserve components. Under this concept, reserve crews fly aircraft assigned to the active component, including C-5, C-141, and KC-10 aircraft. Associate aircrews are a critically important factor for the rapid deployment of land forces--they allow an immediate increase in the utilization rate of strategic airlift assets.[8] The requirement to rely on reserve component mobility forces in the initial stages of a contingency operation is well documented.[9] Total Force is more than a policy for air mobility forces, it is integral to effective wartime operations.

Reserve Component Participation in the Air Mobility Mission

Air reserve component personnel actively participate in the day-to-day, peacetime mobility business. The RAND corporation estimates that 40 percent of the flying hours used to train reserve component crews generate airlift as a by-product.[10] In addition, reserve component tankers on peacetime training missions provide air refueling support for receiver pilot training as well as for operational peacetime missions. Under a new program, Air National Guard and Air Force Reserve units will perform an even greater share of the peacetime mobility workload.*

Air reserve component airlift and tanker personnel have participated in every significant military action since the implementation of the Total Force Policy. These actions include support during crises in Israel (1973), Zaire (1976), Lebanon (1983), Grenada (1985), Honduras (1988), Panama (1989), Kuwait/Iraq (1990), Somalia (1992), and Bosnia (1993). Participation in every crisis except Desert Storm was on a strictly voluntary basis.[11] The extent of air reserve component participation has been extensive. For example, the Air National Guard flew 178 tactical airlift sorties in support of Operation Just Cause, the 1989 U.S. military operation in Panama. These missions moved more than 3000 personnel and hauled over 550 tons of cargo.[12] During Operation Provide Relief, reserve component C-130 and C-141 aircraft delivered more than 1800 tons of relief supplies to Somalia.[13] Most recently, Air National Guard C-130 crews engaged in the air drop of humanitarian supplies in eastern Bosnia.

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* The program, called Phoenix Pace, was implemented to improve active duty pilot retention by relieving active duty airlift and tanker units from the grueling pace generated by a large increase in mobility taskings over the past few years.[14]

The greatest test for air reserve component mobility forces occurred during Operations Desert Shield and Desert Storm. The latest RAND study on the Total Force depicted the Persian Gulf Conflict as:

- The first large scale call-up and use of Reserve Forces since the Korean War;
- The first major conflict under the Department of Defense's (DoD) Total Force Policy; and
- The first call-up using the new authority to use reserve forces provided by Congress in 1976.[15]

In the first month of the crisis, air reserve component volunteers flew 42 percent of the strategic airlift missions and 33 percent of the air refueling missions. During Operation Desert Shield, they moved more than 188,000 personnel and 375,000 tons of cargo to Saudi Arabia. By 13 January 1991, a total of 14,328 air reserve component personnel were called to duty for Operation Desert Storm.[16] The outstanding accomplishments of air reserve mobility forces during the Persian Gulf Conflict are a direct reflection of their capabilities and readiness.

Capabilities and Readiness of Air Reserve Component Mobility Forces

Because U.S. military strategy strongly relies on the reserve components, the services must ensure these forces maintain a credible capability. Official U.S. Air Force doctrine recognizes this responsibility. It states: ". . . reliance on air reserve components requires that they have first class equipment, excellent training, superior mobilization plans and procedures, and combat forces capable of being fully integrated into the regular forces."[17] Former Secretary of Defense Casper Weinberger insisted that active and reserve units with similar missions should have equal claim on modern equipment.[18] Reserve component mobility forces fly the same aircraft as their active

counterparts. Current plans for the next generation airlifter--the C-17--include Reserve Associate augmentation for each active duty squadron.[19]

Although each component flies similar aircraft, the active component maintains greater capability than the reserves in certain areas. Typically, about 75 to 80 percent of active strategic airlift aircrews are proficient in events such as air drop and receiver air refueling, which require intensive training. The air reserve components only train about 20 to 25 percent of their crews in these skills. The Somalia operation required the careful management of strategic airlift crews who were qualified in receiver air refueling. As the United States military refocuses on regional conflicts across the globe, the requirement for crews qualified in air drop and receiver air refueling may increase. This could require more intensive training for reserve aircrews.[20]

Training events are a direct reflection of the operational tasking contained in a unit's designed operational capability (DOC) statement. RAND noted that almost all DOC statements for airlift and tanker forces are the same regardless of component. Therefore, in general, training events for active and reserve component aircrews are similar. However, there are some cases where reserve personnel train at a lower level than the active force. For example, training regulations require reserve component KC-135 aircraft commanders to fly only 58 percent of the training sorties, 53 percent of the instrument landing approaches, 50 percent of the tanker air refueling events, and 33 percent of the practice three-engine approach/go arounds as their active counterparts.[21] Reserve component strategic airlift crews are also granted minor exceptions to flying training requirements. Generally C-130 crews train at the same level, regardless of component.[22]

In addition to specific training events, flight training also depends on the operating tempo of the weapon system, which is measured by flying hours per aircrew per month. Operating tempos of reserve component strategic airlift units are significantly lower than those of the active force. In fiscal years (FY) 1989 and 1990, reserve C-141 crewmembers flew about half of the flying hours per month as their active counterparts. During FY 90, flying hours for each component were about equal due to Desert Shield and Desert Storm. However, the program through FY 94 allocates between 11 and 12 flying hours per month to reserve component airlift crews, while programming about 27 hours for active forces. Tanker crews fly at about the same operating tempo, regardless of component.[23]

The reasons for training differences between active and reserve components must be fully articulated, otherwise auditors may question active duty training levels. Several reasons appear to justify the reduced training events and lower operating tempo of the air reserve mobility forces. First, the reserve components are manned with experienced personnel who can maintain readiness with slightly reduced training opportunity. In addition, active component flying hours not only provide proficiency training; they also provide a vehicle to experience or "season" crewmembers for positions of greater responsibility (aircraft commander, instructor pilot, etc.). The overwhelming percentage of reserve component crewmembers have prior active service and thus have already attained these advanced levels. Finally, reserve component units can be expected to fly at reduced operating tempos because they do not keep as many crews proficient in some events which require intensive training.

In spite of some training differences, air reserve component mobility units are ready. In fact, the Air Force expects its reserve units to maintain

the same readiness standards as the active force.[24] Air reserve mobility forces must be capable of rapid deployment because they comprise a significant percentage of the forces needed during the initial stages of a crisis or contingency. RAND has reported that all reserve component airlift and tanker units are expected to respond with 72 hours of notification. Some units must prepare for a 36 hour response time.[25]

Readiness can also be judged by unit inspections. Air reserve component units receive the same inspections as the active force. Their record during these inspections is equivalent to that of similar active component units in terms of job skills. After the Gulf Conflict, some minor equipment deficiencies have turned up in the reserve components, but overall the Air National Guard and Air Force Reserve mobility units have compiled an excellent inspection record.[26]

In addition to inspections, air reserve component airlift and tanker units participate in all major exercises, including Red Flag and major joint exercises held across the globe. Reserve component units have also excelled in flying competitions, such as Airlift Rodeo. Judging readiness from competitions, exercises, and inspections can be difficult because these events are by nature constrained and focused on a particular time and space.[27] Nevertheless, the record of the air reserve component in these events, coupled with effective performance during real-world contingencies, indicates that Air National Guard and Air Force Reserve tanker and airlift crews are a capable and ready force.

Accessibility of Air Reserve Component Mobility Forces

In addition to being capable and ready, reserve forces must be accessible to the National Command Authority during crises. Reserve component personnel

can augment active forces by volunteering individually or through formal activation. In peacetime, the Air Force routinely uses volunteer reservists. The RAND study contends that the Air Force views volunteers as a peacetime force expansion option.[28] Indeed, the Secretary of Defense has delegated the authority to use volunteer reservists to the gaining major command for the Air Force. Air Force Regulation 28-5, USAF Mobilization Planning, states that air reserve component volunteer forces are ready and available for use in contingencies at a moment's notice.[29] In fact, volunteers have been responsible for most of the contribution made by reserve forces over the past twenty years--Desert Shield/Storm was the only instance of presidential call-up authority since the Total Force Policy was implemented. Reserve component volunteers airlifted the first U.S. ground troops to Honduras in 1988. In 1989 reserve volunteers flew some of the C-141s that dropped the first wave of airborne troops on Panama.[30] More than 500 reservists volunteered for duty on the first day of Operation Desert Shield; by 22 August 1990, 9,729 air reserve component volunteers were serving on active duty.[31]

RAND quotes the Air Force Reserve as stating that "planners could assume that 25 percent of the Air Reserve Component would volunteer for military actions and that this should be accounted for in the deliberate planning process."[32] Although historic volunteer rates have been outstanding, basing future planning on such an assumption involves a degree of risk. According to a 1990 DoD report to Congress on the Total Force Policy,

> While volunteers offer maximum flexibility, cost effectiveness, and responsiveness for the capability attained, several concerns remain. These include: (1) uncertainty regarding the amount and duration of voluntary participation; (2) loss of integral team/unit capability when larger units do not volunteer together; and (3) possible employer reprisals against employees who volunteer for active duty.[33]

Such concerns were echoed in the 1992 Secretary of Defense's Report to Congress, which stated that in spite of the tremendous contribution of the many volunteer air reserve mobility crews and support personnel during the initial stages of Desert Shield, it was not until these forces were activated that [the Air Force] could exploit the full potential of all airlift systems.[34]

Prior to 1976, the President had to declare a national emergency in order to mobilize reserve units. Congress has since authorized the President under Sections 12 and 637b of Title 10, U.S. code to selectively call up to 200,000 reservists for 180 days of active duty without declaring a national emergency. Because of this option, defense planners were able to place a greater reliance on reserve forces during contingencies. The RAND study points out that "the new authority was perceived as useful to the military in certain circumstances but, unless it was only a step to a larger mobilization, [such limited authority] meant the contingency would need to be of short duration and limited size."[35] Nevertheless, this call-up authority is the basis of Air Force planning for the use of reserve forces.[36]

Cost Differences Between Active and Reserve Components

The Air Force's published doctrine states that "given the current threat situation and continuing economic pressures, there is little reason to believe the trend towards greater reliance on reserve components will decrease.[37] Concerning air mobility forces, the Air Force Chief of Staff has said, "I think there's some opportunity for more tankers, more airlift, in the Guard and Reserve."[38] In the past, Senator Sam Nunn has advocated assigning the entire tactical airlift mission to the reserve components.[39] Not surprisingly, in its

1992 study RAND found that the issue of costs, and how they were defined, was pivotal to the discussions of various force options.[40]

To date, defense planners have used two approaches to increase the air reserve components' share of the Total Force: (1) add more aircraft in new or existing Air National Guard or Air Force Reserve units; or (2) increase the reserve component share of the crew force by creating associate units while making a corresponding cut in active duty crews. Each approach has cost implications. Forming new reserve units may entail steep transition costs. Adding aircraft to make existing Reserve or Guard units more "robust" can be cost effective depending on the facilities available. Forming associate units saves some manpower costs without adding steep transition costs.

In 1991 RAND developed a methodology to analyze the cost implications of shifting the active/reserve balance. As part of the methodology development, analysts examined a proposal to transfer 26 C-5A aircraft to the reserve forces as a cost reduction measure. Although the proposal was never implemented, the RAND study predicted substantial transition costs. In addition, because the particular C-5 squadrons operated under the Reserve Associate concept, half of the aircrews in the active C-5 unit were already in the reserves, flying at a lower operating tempo. This resulted in a reduced potential for savings resulting from manpower costs. Cost analysts must also consider the extent of full-time manpower required in reserve component flying units. Typically, this figure is 25 to 30 percent of unit personnel.[41]

As part of the 1992 study, RAND analyzed peacetime costs incurred by the DoD (regardless of who pays) including direct recurring costs, indirect recurring costs, and near-term implementation costs. In analyzing air mobility forces, RAND predicted that any potential cost savings from transferring active

KC-135s to the reserve components depended on how the additional aircraft were added--reserve component KC-135 units operate at about the same tempo as active units. RAND analysts thought that significant base support costs could be achieved by adding additional aircraft to existing reserve component KC-135 squadrons. For airlift assets, RAND found that moving cargo aircraft from the active to the reserve component generally increases DoD costs. This is because strategic airlift flying hours that yield usable transportation services are reimbursable through an industrial fund; reserve component flying hours do not yield usable transportation services at the same rate as the active force because the reserves spend more time training closer to home base.[46]

The costs of various force structure mixes depend on a myriad of complex, intertwining factors. Each specific proposal requires detailed investigation. Decision makers must skeptically examine blanket statements on the potential savings of transferring forces to the reserve components.

Changing the Balance of Active and Reserve Components

In their latest study, RAND analysts examined three alternate force structures, each at a budget level 10 percent lower than the Base Force. The alternatives are labeled "Aspin C," Alternative "x," and Alternative "y."[47]

Table 2 shows that the strategic airlift and tanker forces of each alternative are nearly the same and roughly equivalent to the Base Force in capability. Compared to the Base Force, "Aspin C" relies on more on independent reserve airlift units rather than Reserve Associate programs. This option contains a slightly higher level of strategic lift and provides for a small increase in the tanker-to-fighter ratio than the Base Force. Alternatives "x" and "y" also slightly increase the tanker-to-fighter ratio from the Base Force.

In these options, the overall tanker numbers are smaller than those in the Base Force because each alternative has fewer fighters than the Base Force. Alternative "y" transfers about 50 percent of the Base Force active duty tanker manning to Reserve Associate units.[49]

TABLE 2

Force Mix Alternatives[48]

(Total PAA / % PAA in ARC / % Aircrews in ARC)

	BASE FORCE	ASPIN C	ALT X	ALT Y
SAL	339/30.4/65.2	353/51/75.5	339/30.4/65.2	339/30.4/65.2
TAL	450/65.7/65.7	400/75/75	400/65.7/65.7	400/65.7/65.7
TKR	564/46.4/51.5	452/45.1/51.4	510/46.1/51.7	510/46.1/73.0

NOTE: PAA = Primary Aircraft Authorized, SAL = Strategic Airlift, TAL = Tactical Airlift, TKR = Tanker.

Each alternative reduced tactical airlift forces; the "Aspin C" option substantially reduced active component tactical airlift. This is significant because recent world events have resulted in extensive use of the C-130 for humanitarian and peacekeeping missions in Northern Iraq, Somalia, and Bosnia.[50] John O. Marsh, Jr., Chairman of the Reserve Forces Policy Board, has cautioned against assigning missions to the reserve component that cannot be supported "within the parameters of Reserve Component recruiting, retention, equipment, facilities, full-time manning, and training."[51] Because of the demand on tactical airlift forces, placing an even greater share of the force in the reserve components could have an adverse effect on the a delicate manpower balance between active and reserve forces. A similar demand will exist for strategic airlift aircrews under "Aspin C" and for tanker aircrews under Alternative "y." In these cases, about three-quarters of the aircrew manning resides in the reserve components. The increased demand on these people could

lower Air National Guard and Air Force Reserve recruitment and retention. At the same time, a smaller active force would be less able to provide experienced crewmembers to the reserve components. The problem could be particularly evident in the pilot force. RAND is conducting further study on this "pilot sustainability" issue.[52] For the Air Force, a significant change in the balance of active and reserve components will have a definite impact on rated management policies.

A Rated Management Primer

Rated Management encompasses all of the policies and procedures that shape the USAF pilot and navigator force. Each rated officer is assigned a major weapon system identifier (strategic airlift, tactical airlift, or tanker for mobility crewmembers). Within each weapon system, manpower requirements include staff and training positions as well as billets in the operational units. A separate group of requirements (the general operations staff) can be filled by rated officers from any weapon system. During each budget cycle, planners match projected pilot and navigator inventories against the programmed requirements for the next six years.

Two factors shape inventory projections: anticipated retention rates and accessions from initial training. When faced with a projected pilot shortage, the Air Force can either train more pilots, implement actions to improve retention, or do a combination of both. Training more pilots is not the ideal solution--an influx of inexperienced flyers reduces readiness. In a shortage situation, the personnel system could rapidly reassign experienced officers from flying units to fill staff requirements. To stop this experience drain, major commands have established weapon system "experience" and "stability"

objectives. These readiness goals limit the number of new rated officers that can be "absorbed" into each weapon system. Should a pilot shortage exist, staff requirements are filled based on mission priority.

With new accessions limited by operational readiness constraints, the Air Force addresses projected manpower shortages in two ways. First, rated requirements can be analyzed and reduced where appropriate. Reductions resulting from decreasing force structure do not help in the long term. Cockpits are the only way to provide experience for the pilot force. On the other hand, since virtually all staff and training requirements call for an experienced officer, staff reductions reduce the demand for experienced pilots. The second method of addressing a projected shortage is through retention initiatives, such as the pilot bonus. If retention incentives are not successful, the Air Force may mandate better retention by increasing the active duty service commitment for initial flying training.

Rated Management Implications for the Total Force

Smaller active forces will produce fewer prior service officers available to join the Air National Guard and Air Force Reserve. Prior service pilots make an overwhelming contribution to air reserve component effectiveness. RAND analysts found that more than 98 percent of reserve component pilots have prior service experience.[53]

At the extreme, both the active and reserve components will compete for the same experienced pilots. Solutions which address only one component may harm the other, resulting in a less effective Total Force. Mandating active component retention through increased active duty service commitment will have a direct impact on how many pilots can move to the reserve component in a given

year. On the other hand, incentives to attract departing active duty pilots to the reserve components can have a harmful effect on the Total Force. Too tempting an incentive program might contribute to projected active duty pilot shortages by encouraging more pilots to leave active duty. Traditionally, the air reserve components attract about 30 percent of officers with 4-15 years of active service. This rate is the lowest of any service. RAND analysts project that some of the remaining 70 percent of officers departing the active Air Force could cushion any sizable increase in the air reserve components.[54]

Incentives that improve reserve component retention will help the rated management issue, but reserve component retention has historically been very high--only about 10 percent of the force turns over per year. There is some concern that increasing reliance on reserve forces could adversely affect retention rates. Air National Guard Colonel Michael N. Killworth contends that frequent call-ups would seriously impact Air Guard recruiting and retention. He states that overreliance on reserve forces can threaten or negate the citizen-soldier concept due to its impact on civilian lives or careers. Killworth cites Major General Duane Corning's 1975 testimony before Congress that Guard units "could not long survive if subjected to frequent call-ups for less than the most urgent reasons."[55] Although frequent disruptions might eventually effect all reserve component specialties, the first indications could well appear in highly technical fields, such as the pilot force.

A Total Force Approach to Rated Management

There are several ways to look at the rated management issue from a Total Force perspective. Pilot retention will always be cyclic. The system becomes unbalanced when there are not enough active duty cockpits to "absorb" new

pilots and still maintain unit experience and stability objectives. One solution to the absorption problem involves placing new active duty pilots and navigators in reserve component units for their first three years of experience. This eventually produces a larger pool of experienced flyers available to the Total Force. This concept, called "Project Season," was tried in the early eighties, primarily for fighter pilots.[56] The program lost senior leadership support because of training issues and concerns over the initial professional development of the young officers.

Placing experienced active pilots in reserve units does not solve the long-term rated management issue.* Any reverse associate program, where an experienced active duty cadre flies with a reserve component unit, only adds to the overall requirement for experienced rated officers. Senator Sam Nunn has suggested requiring two years of active duty service in the reserve components as a prerequisite for promotion above the grades of lieutenant colonel for active officers.[57] Although such a concept may lead to greater understanding between reserve and active officers, the idea would help the rated management issue only if the active member's tour with the reserve components were the first in the service, such as Project Season. Otherwise it only increases the demand for experienced officers.

Another long-term solution is to increase the number of initial pilot training graduates who go directly to the reserve components as Air National Guard and Air Force Reserve officers. Because the reserves tend to keep their new pilots longer than the active forces, these increased accessions could mature and provide experience in place of prior service officers.[58] Although prior service pilots allow the reserve components to save some training costs,

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* Currently some experienced active duty captains are serving with reserve units to relieve a short-term active duty overage associated with the force drawdown.

there are disadvantages to a high prior service population, including higher compensation costs, grade stagnation, and an aging force.[59]

In 1984 Air Force Colonel Terry Isaacson called for a Total Force approach to rated management. At that time he noted that the primary Air Force document addressing rated management contained only six paragraphs that addressed the reserve components out of 150 pages.[60] Unfortunately, the latest Rated Management Document has a similar focus. Of course, sustainment of the Total Force from a rated management perspective is a long-term issue. As force structure draws down, an initial overage of experienced personnel masks long-term manpower concerns. However, defense planners must not allow this short-term surplus to overly influence force structure decisions. The Reserve Forces Policy Board favors a new force balance that provides the capability to transition active duty personnel who are affected by drawdowns into the reserve components.[61] Although this appears to be a worthy endeavor, planners must address the long-term ability of the active component to sustain the reserves. In spite of the active force drawdowns associated with the Base Force, the Air Force is still projecting a 2,129 pilot shortfall by FY 97.[62]

Why Have Reserve Forces?

Thus far, both Congress and DoD have generally agreed on the size and balance of Air Force active and reserve components.[63] Because airlift and air refueling are indispensible to the nation's national defense strategy, force reductions to date have generally spared air mobility capability. However, as fiscal pressures build, the search continues for an elusive "peace dividend."*

* One option examined by the Congressional Budget Office (CBO) proposes reduced readiness, cadre units, and stored equipment--in essence a "mothballed" capability costing about 13 percent less than the Base Force.[65]

Rated management issues and even the cost effectiveness of reserve forces are only factors in an extremely complex equation--how to best structure U.S. armed forces for the challenges ahead. To understand the effect of reserve components on future force structure decisions one must look at the traditional justification for reserves.

A history of the reserve forces prepared for Congress by Elaine Galloway in 1957 emphasized that two oceans and two nonaggressive neighbors have shaped America's concept of national defense. This geography has fostered the traditional American belief that large standing armies were both a menace to liberty and an economic burden--armed forces can give the Federal Government too much power. The Galloway history contends that for the apparently theoretical possibility of war, there was a theoretical answer: to expand a small peacetime army by volunteers and by calling up the militia.[64]

One of the earliest and strongest proponents of reserve forces in this century, General John McAuley Palmer, favored a small regular army. Palmer thought that the National Guard could provide most of the nation's defense, with regulars manning isolated garrisons, handling minor emergencies, and providing assistance for the reserve forces. One U.S. Army historian notes that current Army force structure is in large measure a reflection of General Palmer's ideas.[66]

Of course, relying on reserve forces for the nation's defense presupposes that time is available to train, equip, and mobilize the reserves. In both World War I and World War II preparation for major combat operations required two years--after the fighting had started.[67] Today, the complexity of modern weapons, especially in the Air Force, would considerably extend preparation time. In the bipolar, Cold War environment nuclear weapons dominated strategic

planning and forward deployed troops were part of a deterrent to superpower aggression.[68] Policy makers realized that a well-armed and ready enemy might deprive us of the time needed to prepare after hostilities commenced. The result was large, permanent forces and a ready reserve.

Until the Korean War, reserve forces were almost always thought of in terms of mobilizing for total war.[69] Korea confronted military planners with the possibility of a long-term limited conflict. The problems associated with a partial mobilization of reservists for a limited war started a series of legislative actions to ensure reservists were well trained, properly equipped, and accessible.

Total Force: The Political Dimension

Although military strategy plays a prime role in determining the size and shape of the reserve components, there is an important political dimension involving reserve force issues. Some policy makers believe that the mobilization of reserve forces early in a conflict ensures that the military action represents the political will of the people.[70] Although selected Air Force Reserve and Air National Guard units were activated during the Vietnam War, President Lyndon Johnson was very reluctant to employ large scale mobilization because of the domestic political implications. This issue of political consensus may be one reason why the reserve components were quickly activated during Desert Shield/Storm. Secretary of Defense Aspin has also commented that active forces have an advantage over reserve forces in some situations--their availability is not contingent on the politically sensitive decision to mobilize.[71] Historian Charles J. Gross addresses another "political signal"

that can be sent by reserve forces: excessive reliance on reserves might be perceived as a sign of weakness by potential adversaries.[72]

Reserve components certainly have strong support in Congress and in the states. Restrictions on mobilizing reserves gives Congress a powerful role in national security decision making. In addition, National Guard and Reserve units are present in almost every congressional district. Of course, the National Guard has a state, as well as a federal, mission. Other factors in the political equation are lobbying groups such as the Reserve Officer Association and the National Guard Association of the United States. These group are very effective at ensuring the reserve components receive adequate financial and technical assistance to remain a credible combat force.[73]

In a political system designed to promote pluralism at the expense of efficiency, many factors will influence decisions on the size and balance of active and reserve components. Throughout the process, defense planners would be wise to heed the words of national security specialist Robert L. Goldich:

> It is imperative, therefore, that US military manpower analysts and policymakers keep their eyes on the more intangible disciplines of history, philosophy, and politics as well as the comparatively concrete ones of management, administration, and finance. They would thereby obtain a better grasp of the unpredictability, seeming irrationality, and always emotional roots of how a country raises and uses its armed forces.[74]

Building a Total Force

United States military forces are structured to implement the President's National Security Strategy, which is detailed in a document that begins each DoD planning, programming, and budgeting (PPBS) cycle. Robert McNamara initiated PPBS to apply the principles of systems analysis to better balance the cost and effectiveness of military forces and to shape those forces for the overriding strategy. In a 1990 report to Congress on Total Force Policy, the

DoD noted that while cost-benefit considerations are at least implicit in all service methodologies, cost is not the driving factor--supporting national military objectives is.[75] Through PPBS, defense planners review individual service force structure including the balance of active and reserve components.

Some members of Congress, however, have expressed concern that DoD deliberations do not adequately address Total Force options. In fact, a 1989 General Accounting Office report contended that decisions on the use of reserve components occur as by-products of overall force structure decision making.[76] Nonetheless, the latest RAND study on the Total Force found that risk, mobilization, deployment, and cost-effectiveness were all considered during the PPBS cycle that developed the Base Force. RAND concluded that Total Force policy was "implemented in the 'practice' of the Base Force decision process."[77]

In building the force, defense planners must consider the advantages and limitations of reserve forces. In general, reservists do best at missions that require a high level of activity in wartime, but have a comparatively low peacetime activity level.[78] The Department of Defense contends that war fighting capability should be placed in the reserve components only to the extent that units can, and will, be called up and mission-ready by the time they are deployed.[79]

There are limitations to reserve effectiveness. In addition to cost considerations and personnel sustainability, many, including Air Force historian Charles J. Gross, believe that reservists would have difficulty effectively operating command and control, basic and advanced technical training, logistics, and technical research and development programs. Gross contends that reserve forces depend upon a strong active duty establishment to provide the basic infrastructure of airpower.[80]

CONCLUSIONS

The Air National Guard and Air Force Reserve are woven into the basic fabric of the United States Air Force. In 1990, DoD reported to Congress that flying units in the Air Reserve Components are much more than forces held in "reserve."[81] As a former Air Force Chief of Staff remarked, air reserve forces are no longer "partners" of the Air Force, they are "part" of it.[82] The reserve components are integral to effective contingency response and combat operations. Air mobility forces--the backbone of Global Reach--are particularly involved in Total Force integration. By 1995 over half of the nation's air mobility capability will reside in the reserve components. Although this paper focused on air mobility, the balance between the active and reserve components is an issue facing every service.

The increased warning times resulting from reduced international tensions appear to support options that place more of the United States military capability in the reserve components. At the same time, a shrinking defense budget drives policy makers to consider the cost advantages of changing the balance of active and reserve forces, with some justification. Under the Total Force Policy, the Air National Guard and Air Force Reserve have proven themselves a ready, credible, and cost-effective force.

Nevertheless, significantly changing the balance between active and reserve components may prove to be a costly exercise, both in terms of dollars and readiness. A delicate balance exists between active and reserve forces. Training costs will rise if the reserve components must increase their capability to perform missions requiring intensive training that are presently tasked to active forces. In the long term, rated management dynamics may

result in a smaller active force competing with the reserves for the same experienced pilots. With fewer prior service experienced pilots available to the air reserve components, the reserve forces would require additional training to maintain the same level of readiness. Because there is no reason to doubt that the United States will remain actively engaged in all regions of the world, a relatively larger reserve force could find itself being called on more frequently. Constant disruption of lives and civilian careers could have a harmful effect on reserve component recruiting and retention.

On the other hand, there are strong historical and political reasons for maintaining a potent reserve force. The changing international environment and the focus on rebuilding the economy invite new solutions. Many of the perceived problems in changing the active/reserve balance are long term. There is no correct answer to the active/reserve issue. Like all national security issues, it poses questions of risk, resource allocation, and political uncertainties.

Military professionals can only give their best advice to decision makers based on experience and professional judgment. In addressing the issue they must ask three key questions: (1) Can reserve forces remain ready and credible when faced with increased demands? (2) What are the long- and short-term costs of shifting force structure to the reserve components and what are the costs of ensuring those forces remain ready? and (3) Can the active component sustain the reserve components with technical support and experienced personnel? Building a flexible force to face the challenges of a murky future will require innovative thinking and active leadership. Should policy makers direct a major shift in the active/reserve balance, military leaders must be flexible enough to optimize that force in the pursuit of national security objectives.

NOTES

1. For example, see Senator Sam Nunn, "More Missions Sustain Nation's Combat Muscle," The Officer (February 1991): 18; James W. Browning et al, "The U.S. Reserve System: Attitudes, Perceptions, and Realities," in The Guard and Reserve in the Total Force, p. 68. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985); and Leslie Lewis, C. Robert Roll, and John D. Mayer, Assessing the Structure and Mix of Future Active and Reserve Forces: Assessment of Policies and Practices for Implementing the Total Force Policy, (Santa Monica Ca: RAND Corp, 1992), 26.

2. Les Aspin, "The Debate Over the Use of Military Force." Memorandum, 21 September 1992.

3. Nunn, 22.

4. Marygail Brauner, Harry Thie, and Roger Brown, Assessing the Structure and Mix of Future Active and Reserve Forces: Effectiveness of Total Force Policy During the Persian Gulf Conflict, (Santa Monica CA: RAND Corp, 1992), 84.

5. Richard B. Cheney, Report of the Secretary of Defense to the President and Congress, (Washington D.C.: US Government Printing Offive, January 1991), 104.

6. Basic Aerospace Doctrine of the United States, Air Force Manual 1-1, Volume II, (Washington DC: Department of the Air Force, March 1992), 186-190.

7. Force structure information as of FQ 92/4 provided by HQ AF/XOFM.

8. Edward D. Simms, Chris C. Demchak, and Joseph R. Wilk, "Reserve Component Logistics Units in the Total Force," in The Guard and Reserve in the Total Force: The First Decade 1973-1983, p. 171. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985).

9. For example, see Brauner, Thie, and Brown, 24; General Colin L. Powell, "All Elements of Total Force Give Military Prowess," The Officer, (February 1991): 14; and Steven M. Duncan, "Reserve Shares Success Story," The Officer, (February 1993): 36.

10. Michael G. Shanley, Active/Reserve Cost Methodology, (Santa Monica CA: RAND Corp, 1991), 17.

11. Brigadier General Billy M. Knowles USAF (RET), "50-50 and 18% by 97." The Officer, (November 1992): 12-13.

12. Colonel Michael N. Killworth ANG, The Silent Call-up Option: Volunteerism in the Air National Guard, (Maxwell AFB AL: Air University Press, 1992), 26.

13. "Washington Capitol Letter," The Officer, (January 1993): 7.

14. "Phoenix Pace Gives Guard Crews More Flight Time." On Guard, (January 1993): 3.

15. Brauner, Thie, and Brown, xiii.

16. Steven M. Duncan, "Gulf War Was a Test of Reserve Components and They Passed," The Officer, (June 1991): 23.

17. Basic Aerospace Doctrine of the United States, 231-232.

18. Edward J. Philbin and James L. Guild, "The Guard and Reserve: In Pursuit of Full Integration," in The Guard and Reserve in the Total Force: The First Decade 1973-1983, p. 52. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985).

19. C-17 information provided by HQ AMC Analysis Group.

20. Training statistics and discussion on Somalia provided by HQ AMC Analysis Group.

21. National Defense Research Institute, Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense, (Santa Monica CA: RAND Corp, 1992), 142.

22. Training information provided by HQ AMC Combat Operations and Training.

23. OPTEMPO information found in Report of the Secretary of Defense to the President and Congress. (Washington DC: US Government Printing Office, 1987 - 1991). Programmed data updated by HQ AMC/XOTR.

24. National Defense Research Institute, 56.

25. Ibid., 142.

26. Inspection information provided by HQ AMC/IGIO.

27. Bennie J. Wilson, Ed., The Guard and the Reserve in the Total Force: The First Decase 1973-1983, (Washington DC: NDU Press, 1985), xiv.

28. Brauner, Thie, and Brown, 26.

29. USAF Regulation 28-5, USAF Mobilization Planning, (22 February 1991): 74.

30. Major General John J. Closner, III, "Proud and Equal Partner on USAF Total Force Team," The Officer, (February 1991): 63.

31. Duncan, 23.

32. National Defense Research Institute, 61.

33. Department of Defense, Total Force Policy, (Washington DC: U.S. Government Printing Office, December 1990): 6.

34. Richard B. Cheney, Report of the Secretary of Defense to the President and Congress, (Washington D.C.: US Govy Printing Offive, January 1992), 93.

35. Brauner, Thie, and Brown, xiv.

36. Killworth, xi.

37. Basic Aerospace Doctrine of the United States, 231.

38. General Merrill A. McPeak, "Chief of Staff of the Air Force Speaks Out on the National Guard," The National Guard, (January 1993), 38.

39. Nunn, 20.

40. Lewis, Roll, and Mayer, 35.

41. Shanley, vi and 17.

46. Adele R. Palmer et al., Assessing the Structure and Mix of Future Active and Reserve Forces: Cost Estimation Methodology, (Santa Monica CA: RAND Corp, 1992), 10 and 56-61.

47. National Defense Research Institute, 181.

48. Ibid., 201.

49. Ibid., 190-196.

50. Ibid., 240.

51. John O. Marsh, Jr., "Reserve Reaches Unprecedented Readiness Levels," The Officer, (February 1991): 38.

52. National Defense Research Institute, 234.

53. Ibid., 140.

54. Ibid., 282.

55. Killworth, xii and 5.

56. USAF Rated Management Document, Vol. I, (October 1985): 12-8.

57. Nunn, 21.

58. Discussions on efficacy of training more initial reserve component pilots (primarily for the fighter force) with HQ USAF/SAY.

59. Arthur L. Moxon, "U.S. Reserve Forces: The Achilles' Heel of the All Volunteer Force?" in The Guard and Reserve in the Total Force: The First Decade 1973-1983, p. 103. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985).

60. Terry C. Isaacson, "Total Force Pilot Management," A research report submitted the the Air War College Faculty, (Maxwell AFB AL, 1984): 37.

61. Marsh, 38.

62. Pilot inventory and requirement data provided by HQ AF/DPXXO.

63. National Defense Research Institute, xxx.

64. Elaine Galloway, History of United States Military Policy on Reserve Forces 1775-1957, Report to Committee on Armed Services, House of Representatives, (Washington: US Government Printing Office, 1957).

65. John T. Correll, "The Force Mix Fight Heats Up," Air Force Magazine, (January 1993): 67.

66. Jonathan M. House, "John McAuley Palmer and the Reserve Components," in The Guard and Reserve in the Total Force: The First Decade 1973-1983, pp. 30, 37-38. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985).

67. Galloway, 490.

68. Ibid., 441.

69. Ibid., 465-469.

70. National Defense Research Institute, xxiv.

71. Les Aspin, "Does Total Force Remain Vital in Post-Cold War?" The Officer, (February 1991): 26.

72. Charles J. Gross, Prelude to the Total Force: The Air Natiional Guard 1943-1969, (Washington DC: U.S. Government Printing Office, 1985), 170.

73. Ibid., 11.

74. Robert L. Goldich, "Historical Continuity in the U.S. Military Reserve System," in The Guard and Reserve in the Total Force: The First Decade 1973-1983, p. 27. Edited by Bennie J. Wilson. (Washington DC: NDU Press, 1985).

75. Department of Defense, Total Force Policy, 30.

76. GAO NSIAD-90-26, December 1989, cited in Lewis, Roll, Mayer, 4.

77. See National Defense Research Institute, xxii and 81; and Lewis, Roll, Mayer, 55.

78. Department of Defense, Total Force Policy, 29.

79. Ibid., 3.

80. Gross, 170-171.

81. Department of Defense, Total Force Policy, 5.

82. Gerald T. Cantwell, "The United States Air Force Reserve, 1916-1980," A USAFR Synoptic History, (Headquarters Air Force Reserve, March 1981): 18.

BIBLIOGRAPHY

1. Aspin, Congressman Les. "Does Total Force Remain Vital in Post-Cold War?" The Officer. (February 1991).

2. _____. "The Debate Over the Use of Military Force." Memorandum, 21 September 1992.

3. Brauner, Marygail, Harry Thie, and Roger Brown. Assessing the Structure and Mix of Future Active and Reserve Forces: Effectiveness of Total Force Policy During the Persian Gulf Conflict, Santa Monica CA: RAND Corp, 1992.

4. Cantwell, Gerald T. "The United States Air Force Reserve, 1916-1980." A USAFR Synoptic History. Headquarters Air Force Reserve, March 1981.

5. Closner, Major General John J., III. "Proud and Equal Partner on USAF Total Force Team." The Officer. (February 1991).

6. Correll, John T. "The Force Mix Fight Heats Up." Air Force Magazine. (January 1993).

7. Department of Defense. Total Force Policy. Washington DC: U.S. Government Printing Office, December 1990.

8. Duncan, Steven M. "Gulf War Was a Test of Reserve Components and They Passed." The Officer. (June 1991).

9. _____. "Reserve Shares Success Story." The Officer. (February 1993).

10. Galloway, Elaine. History of United States Military Policy on Reserve Forces 1775-1957. Report to Committee on Armed Services, House of Representatives. Washington: US Government Printing Office, 1957.

11. Gross, Charles J. Prelude to the Total Force: The Air National Guard 1943-1969. Washington DC: U.S. Government Printing Office, 1985.

12. Isaacson, Terry C. "Total Force Pilot Management." A research report submitted the the Air War College Faculty. Maxwell AFB AL, 1984.

13. Killworth, Michael N. The Silent Call-up Option: Volunteerism in the Air National Guard. Maxwell AFB AL: Air University Press, 1992.

14. Knowles, Brigadier General Billy M., USAF (RET). "50-50 and 18% by 97." The Officer. (November 1992).

15. Lewis, Leslie, C. Robert Roll, and John D. Mayer. Assessing the Structure and Mix of Future Active and Reserve Forces: Assessment of Policies and Practices for Implementing the Total Force Policy. Santa Monica CA: RAND Corp, 1992.

16. Marsh, John O., Jr. "Reserve Reaches Unprecedented Readiness Levels" The Officer. (February 1991).

17. McPeak, General Merrill A. "Chief of Staff of the Air Force Speaks Out on the National Guard." The National Guard. (January 1993).

18. National Defense Research Institute. Assessing the Structure and Mix of Future Active and Reserve Forces: Final Report to the Secretary of Defense. Santa Monica CA: RAND Corp, 1992.

19. National Security Strategy of the United States. Washington DC: U.S. Government Printing Office, 1993.

20. Nunn, Senator Sam. "More Missions Sustain Nation's Combat Muscle." The Officer (February 1991)

21. Palmer, Adele R., et al. Assessing the Structure and Mix of Future Active and Reserve Forces: Cost Estimation Methodology. Santa Monica CA: RAND Corp, 1992.

22. "Phoenix Pace Gives Guard Crews More Flight Time." On Guard. (January 1993).

23. Powell, General Colin L. "All Elements of Total Force Give Military Prowess." The Officer. (February 1991).

24. Report of the Secretary of Defense to the President and Congress. (Washington DC: US Government Printing Office, 1987 - 1992).

25. Shanley, Michael G. Active/Reserve Cost Methodology. Santa Monica CA: RAND Corp, 1991.

26. United States Air Force Manual 1-1, Vol. II. Basic Aerospace Doctrine of the United States. Washington DC: Department of the Air Force, March 1992.

27. United States Air Force Rated Management Document, Vol. I. (1984-1993).

28. United States Air Force Regulation 28-5. USAF Mobilization Planning. (22 February 1991).

29. "Washington Capitol Letter." The Officer. (January 1993).

30. Wilson, Bennie J., ed. The Guard and Reserve in the Total Force. Washington DC: NDU Press, 1985.